

File 347:JAPIO Nov 1976-2004/Mar(Updated 040708)

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File 350:Derwent WPIX 1963-2004/UD,UM &UP=200445

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Set	Items	Description
S1	1697	GARBAGE(2N)COLLECT? OR AUTOMAT?(2N)MEMOR???(2N)MANAG?
S2	10	(CALL()STACK? ? OR REGISTER? ?)(10N)HEAP
S3	57	(POINTER? ? OR IDENTIF???? OR IDENTIFICATION OR ADDRESS???
		OR MAP????)(7N)HEAP
S4	8	(POINTER? ? OR IDENTIF???? OR IDENTIFICATION OR ADDRESS???
		OR MAP????)(7N)(CALL()SITE? ?)
S5	392	DESCRIPTOR? ?(10N)(STACK()FRAME? ? OR REGISTER? ? OR TABLE?
		? OR OFFSET? ? OR OFF()SET? ?)
S6	2096	(OFFSET? ? OR OFF()SET? ?)(7N)(POINTER? ? OR IDENTIF???? OR
		IDENTIFICATION OR ADDRESS???
		OR MAP???? OR HEAP? ? OR STACK(-
)FRAME? ?)
S7	50	CALL()STACK? ?
S8	33	CALL()SITE? ?
S9	0	FIRST()CALL()SITE? ?
S10	2608	DESCRIPTOR? ?
S11	3722	HEAP? ?
S12	144339	OFFSET? ? OR OFF()SET? ?
S13	152	STACK()FRAME? ?
S14	0	S1 AND S2
S15	14	S1 AND S3
S16	0	S1 AND S4
S17	0	S1 AND S5
S18	2	S1 AND S6
S19	2	S1 AND S7
S20	0	S1 AND S8
S21	1	S1 AND S10
S22	105	S1 AND S11
S23	10	S1 AND S12
S24	3	S1 AND S13
S25	29	S15 OR S18:S19 OR S21 OR S23:S24

25/5/1 (Item 1 from file: 347)
DIALOG(R)File 347:JAPIO
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07059773 **Image available**
METHOD FOR FORMING ATTACHMENT FORM FOR **GARBAGE** **COLLECTION** AND
ATTACHMENT FORM FOR **GARBAGE** **COLLECTION** FORMED BY THE METHOD

PUB. NO.: 2001-287410 [JP 2001287410 A]
PUBLISHED: October 16, 2001 (20011016)
INVENTOR(s): YAMANO YUUKO
APPLICANT(s): TOPPAN PRINTING CO LTD
APPL. NO.: 2000-104526 [JP 2000104526]
FILED: April 06, 2000 (20000406)
INTL CLASS: B41J-003/54; B41J-002/475; G09F-003/00; G09F-003/02;
G09F-003/03

ABSTRACT

PROBLEM TO BE SOLVED: To provide a method for forming attachment forms for **garbage** **collection** of even a small lot at low costs in a short time before delivery date.

SOLUTION: According to this method for forming attachment forms for **garbage** **collection**, a fixed information-printing part for front faces and attaching seals prints by a printing unit 22 of a plate system such as an **offset** system or the like, and a variable information-printing part prints by a printer 24 without a plate such as an ink-jet system or the like connected to a computer 25.

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25/5/2 (Item 2 from file: 347)
DIALOG(R)File 347:JAPIO
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03677238 **Image available**
ACCESSABLE OBJECT DECIDING MEANS FOR **GARBAGE** **COLLECTION** SYSTEM

PUB. NO.: 04-042338 [JP 4042338 A]
PUBLISHED: February 12, 1992 (19920212)
INVENTOR(s): YASUMATSU KAZUKI
APPLICANT(s): FUJI XEROX CO LTD [359761] (A Japanese Company or Corporation), JP (Japan)
APPL. NO.: 02-149285 [JP 90149285]
FILED: June 07, 1990 (19900607)
INTL CLASS: [5] G06F-012/00; G06F-009/44
JAPIO CLASS: 45.2 (INFORMATION PROCESSING -- Memory Units); 45.1 (INFORMATION PROCESSING -- Arithmetic Sequence Units)
JOURNAL: Section: P, Section No. 1358, Vol. 16, No. 220, Pg. 5, May 22, 1992 (19920522)

ABSTRACT

PURPOSE: To attain the **garbage** **collection** with high efficiency by shifting an object within a **heap** area after rewriting the value of a **pointer** to the **heap** area.

CONSTITUTION: The indirect reference is given to an object included in a heap area 3 from an area different from the area 3 via an object table 4 storing a pointer to the object. Therefore the area including the object exists in a data area 1, for example, and is not dependent on the pointer corresponding to the data having the possibility of a pointer for reference to the object in the area 3. Thus the object can be shifted with rewrite of the value of the pointer included in the table 4. As a result, the **garbage** can be **collected** with high efficiency in combination with the copy type **garbage** **collection**.

25/5/3 (Item 3 from file: 347)

DIALOG(R)File 347:JAPIO
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02714746 **Image available**
GARBAGE COLLECTION PROCESSING SYSTEM

PUB. NO.: 01-012346 [JP 1012346 A]
PUBLISHED: January 17, 1989 (19890117)
INVENTOR(s): HAYASHI KOJI
 SATO TAKESHI
APPLICANT(s): FUJITSU LTD [000522] (A Japanese Company or Corporation), JP
 (Japan)
APPL. NO.: 62-168421 [JP 87168421]
FILED: July 06, 1987 (19870706)
INTL CLASS: [4] G06F-012/02; G06F-009/44
JAPIO CLASS: 45.2 (INFORMATION PROCESSING -- Memory Units); 45.1
 (INFORMATION PROCESSING -- Arithmetic Sequence Units)
JOURNAL: Section: P, Section No. 865, Vol. 13, No. 185, Pg. 38, May
 02, 1989 (19890502)

ABSTRACT

PURPOSE: To collect the areas of data allocated to a 1st-order heap comprehensively at the time of completing the declaration of usage, by separating the data used in the execution of a program to a permanent heap and the 1st-order heap.

CONSTITUTION: A temporary heap 19 to which the data used transiently is allocated is provided other than the permanent heap 20. The permanent heap 20 becomes the object of **collection** by a **garbage collector** 18, and the data use for a comparatively long time is allocated to the **heap**. A **pointer** switching part 16, when detecting an **identifier** which uses the temporary **heap** 19, controls following data so as to be allocated from the temporary heap 19. A temporary heap collection processing part 17 collects the area of the temporary heap 19 used transiently and unrequired by returning a data allocation pointer to its original position at the time of completing the usage.

25/5/4 (Item 4 from file: 347)
DIALOG(R)File 347:JAPIO
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02636545 **Image available**
METHOD AND SYSTEM FOR IMPROVING DATA STORING EFFICIENCY

PUB. NO.: 63-253445 [JP 63253445 A]
PUBLISHED: October 20, 1988 (19881020)
INVENTOR(s): ROBAATO AREN SHIYOU
APPLICANT(s): YOKOGAWA HEWLETT PACKARD LTD [355232] (A Japanese Company or
 Corporation), JP (Japan)
APPL. NO.: 63-064948 [JP 8864948]
FILED: March 18, 1988 (19880318)
PRIORITY: 7-28,808 [US 28808-1987], US (United States of America),
 March 20, 1987 (19870320)
INTL CLASS: [4] G06F-012/02
JAPIO CLASS: 45.2 (INFORMATION PROCESSING -- Memory Units)
JOURNAL: Section: P, Section No. 828, Vol. 13, No. 66, Pg. 40,
 February 15, 1989 (19890215)

ABSTRACT

PURPOSE: To **collect** the **garbage** in a system including a virtual memory with minimum deterioration of the system performance by reducing the scales of the collectable heaps and a base set.

CONSTITUTION: A system is comprised of a primary storage device containing a base set region and a **heap** region, a dirty page **map** of the primary storage device, a secondary storage device, a dirty page map of the secondary storage device, a valid base set reduction means which responds

to both dirty page maps of the primary and secondary storage devices, a **garbage collection** means which deletes the data receiving no reference out of the heaps in response to the base set reduced effectively, etc. Then the dirty page information is cleared 10 and the new numerical value is stored in a storage device via the user calculation. The dirty bits are set 12 and the pages containing the base sets to which the dirty page maps are written are discriminated 14. Then the dirty page information is cleared 18 and the **garbage** are **collected** 20 via the written base set pages. Finally a program of a flow returning to the step 12 is used.

25/5/5 (Item 5 from file: 347)
DIALOG(R)File 347:JAPIO
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02445153 **Image available**
GARBAGE COLLECTION PROCESSING SYSTEM

PUB. NO.: 63-062053 [JP 63062053 A]
PUBLISHED: March 18, 1988 (19880318)
INVENTOR(s): NAKAMURA SHUICHI
APPLICANT(s): FUJITSU LTD [000522] (A Japanese Company or Corporation), JP
(Japan)
APPL. NO.: 61-207521 [JP 86207521]
FILED: September 03, 1986 (19860903)
INTL CLASS: [4] G06F-012/02; G06F-009/44
JAPIO CLASS: 45.2 (INFORMATION PROCESSING -- Memory Units); 45.1
(INFORMATION PROCESSING -- Arithmetic Sequence Units)
JOURNAL: Section: P, Section No. 740, Vol. 12, No. 284, Pg. 104,
August 04, 1988 (19880804)

ABSTRACT

PURPOSE: To perform the **garbage collection** in an area of an instruction code by using a means which calculates the address displacement from the head address of the calling side and the address of a resetting destination.

CONSTITUTION: When a function calling part 10 calls a function part 11, the head address A of the part 10 serving as the calling side is stored in a head address memory part 13. While a resetting destination address R is stored in a resetting destination address memory part 14. If the **garbage collection** is carried out during execution of the called part 11, an **offset** setting part 16 of a **garbage collection** part 15 tracks all places storing addresses R and replaces the address R with a displacement (R-A) from the head address. When the **garbage collection** is carried out, a shift destination address setting part 17 replaces the contents of the part 13 with an address A1 of a new shift destination. Then a resetting destination address correcting part 18 adds A1 to the contents (R-A) of the part 14 for replacement with a new resetting destination address R1.

25/5/6 (Item 6 from file: 347)
DIALOG(R)File 347:JAPIO
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02383848 **Image available**
GARBAGE COLLECTOR

PUB. NO.: 63-000748 [JP 63000748 A]
PUBLISHED: January 05, 1988 (19880105)
INVENTOR(s): GOTOY YUKARI
APPLICANT(s): MATSUSHITA ELECTRIC IND CO LTD [000582] (A Japanese Company or Corporation), JP (Japan)
APPL. NO.: 61-145140 [JP 86145140]
FILED: June 20, 1986 (19860620)
INTL CLASS: [4] G06F-012/02; G06F-009/44
JAPIO CLASS: 45.2 (INFORMATION PROCESSING -- Memory Units); 45.1
(INFORMATION PROCESSING -- Arithmetic Sequence Units)

ABSTRACT

PURPOSE: To prevent excessive memory areas from being consumed by providing an overflow flag to a multi-reference table and storing a reference count value equal to the overflow amount of a cell where the overflow flag is set in an area shown by a memory address given from a certain base which defines the value of a reference counter as an **offset** value.

CONSTITUTION: An overflow flag 7 is added to a multi-reference table. Then the reference count value equal to the overflow amount of the cell where the flag 7 is set is stored in an area shown by the memory address given from a certain base which defines the value of a reference counter 6 as the **offset** value. Thus it is not needed to secure a reference counter having the largest conceivable scale on a MRT 3 and the minimum necessary area suffices. Thus the excessive memory capacity is not consumed.

25/5/7 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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016320932

WPI Acc No: 2004-478827/200445

XPX Acc No: N04-377523

Computer configuration method for reclamation of memory space, involves
assigning values associated with respective interpretations, to
respective locator entries associated with cards

Patent Assignee: DETLEFS D L (DETL-I)

Inventor: DETLEFS D L

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 20040111718	A1	20040610	US 2002309910	A	20021204	200445 B

Priority Applications (No Type Date): US 2002309910 A 20021204

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 20040111718	A1	17	G06F-009/45	

Abstract (Basic): US 20040111718 A1

NOVELTY - The values associated with respective interpretations, are assigned to respective locator entries associated with cards. The location of a block containing start of a given card associated with a given entry, is determined from the entry associated with the card located after specific number of cards to left of the given card. The number is a function of the locator value associated with the given entry

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

- (1) computer system;
- (2) storage medium containing instructions to configure computer;
- (3) electromagnetic signal representing sequences of instructions to configure computer;

- (4) **garbage collector** .

USE - For configuring computer to operate as **garbage collector** (claimed) for reclamation of memory space.

ADVANTAGE - The cost required for block- **offset** table maintenance and for finding blocks location are reduced.

DESCRIPTION OF DRAWING(S) - The figure shows a block diagram explaining basic functions of compiler.

pp; 17 DwgNo 2/6

Title Terms: COMPUTER; CONFIGURATION; METHOD; RECLAIM; MEMORY; SPACE;
ASSIGN; VALUE; ASSOCIATE; RESPECTIVE; RESPECTIVE; LOCATE; ENTER;
ASSOCIATE; CARD

Derwent Class: T01

International Patent Class (Main): G06F-009/45

25/5/8 (Item 2 from file: 350)
DIALOG(R) File 350:Derwent WPIX
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016080187 **Image available**
WPI Acc No: 2004-238048/200422
XRPX Acc No: N04-188750

Java programming language source-instruction executor for computer system, causes garbage collector to promote pinned object from young to old generation if mutators reaches unpinning point assignment to pinned object allocation

Patent Assignee: CLINGER W D (CLIN-I); DETLEFS D L (DETL-I)

Inventor: CLINGER W D; DETLEFS D L

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 20040039759	A1	20040226	US 2002405485	P	20020823	200422 B
			US 2002295325	A	20021115	

Priority Applications (No Type Date): US 2002405485 P 20020823; US 2002295325 A 20021115

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20040039759	A1	22	G06F-017/30	Provisional application	US 2002405485

Abstract (Basic): US 20040039759 A1

NOVELTY - The executor causes an allocation of an initially pinned object to occur in a young generation (50). Write operation to the objects reference field is performed with and without a write barrier if operation occurs before and after unpinning point assignment, respectively. A **garbage collector** promotes the object from young to old generation if the object meets promotion criteria that the mutators have reached the assignment.

DETAILED DESCRIPTION - The executor runs a mutator and a **garbage collector** to manage a heap of an object to organize it into young and old generations and relies on result of write-barrier execution to keep track of references located in the old generation but not in the young generation. Respective unpinning point in a mutator is assigned to the allocation.

INDEPENDENT CLAIMS are also included for the following:

- (1) a method for executing a mutator that dynamically allocates in a heap of objects
- (2) a storage medium containing instructions readable by a computer to operate as a source-instruction executor
- (3) a computer signal representing sequence of instructions causing to operate as a source-instruction executor
- (4) a means-plus-function that receives source code that specifies operation of a mutator.

USE - Used for executing a Java programming language source-instruction for computer system.

ADVANTAGE - The **garbage collector** avoids promoting an object out of the young generation until the mutator has passed the point where it executes such write operations without write barriers, thereby causing no reference writing in old-generation objects without accompanying write barriers.

DESCRIPTION OF DRAWING(S) - The drawing shows selected parts of a memory space used by a process that employs a **garbage collected** heap.

Heap (10)
Young generation (50)
Old generation (52)
Call stack (54)
Static-variable segment (58)
pp; 22 DwgNo 4/12

Title Terms: PROGRAM; LANGUAGE; SOURCE; INSTRUCTION; COMPUTER; SYSTEM;

CAUSE; GARBAGE; COLLECT; PROMOTE; PIN; OBJECT; YOUNG; GENERATE; REACH;
UNPIN; POINT; ASSIGN; PIN; OBJECT; ALLOCATE
Derwent Class: T01
International Patent Class (Main): G06F-017/30
File Segment: EPI

25/5/9 (Item 3 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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015724288 **Image available**
WPI Acc No: 2003-786488/200374
XRPX Acc No: N03-630233

Memory management facilitation method in computer, involves selectively
invoking transition function to maintain traceable path of select pointer
and state information across call stack, to non- garbage collected
program components

Patent Assignee: MICROSOFT CORP (MICT)
Inventor: TARDITI D R
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 6625808	B1	20030923	US 99459241	A	19991210	200374 B

Priority Applications (No Type Date): US 99459241 A 19991210

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 6625808	B1	18	G06F-009/45		

Abstract (Basic): US 6625808 B1

NOVELTY - The transition points between a garbage and non- **garbage collected** program components of a heterogeneous program, is identified. A transition function is selectively invoked to maintain the traceable path of select pointer and state information across the **call stack**, to the non- **garbage collection** throughout the execution of the heterogeneous program.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

- (1) native code compiler;
- (2) run time environment for implementing memory management facilitation method;
- (3) storage medium for storing memory management facilitation program;
- (4) heterogeneous program compilation method;
- (5) storage medium for storing heterogeneous program compilation program; and
- (6) heterogeneous program compilation program.

USE - For facilitating the management of memory which stores the code of a legacy programming language e.g. Pascal FORTRAN and C language in a computer.

ADVANTAGE - **Automatically** facilitates the **memory management** among the heterogeneous components of a computer program. Since the traceable path of a select pointer and state information are maintained to a non- **garbage collected** program component, the non- garbage component efficiently supports the execution of garbage component of the heterogeneous program.

DESCRIPTION OF DRAWING(S) - The figure shows the flowchart explaining the heterogeneous program compilation process.
pp; 18 DwgNo 5/10

Title Terms: MEMORY; MANAGEMENT; FACILITATE; METHOD; COMPUTER; SELECT;
INVOKE; TRANSITION; FUNCTION; MAINTAIN; TRACE; PATH; SELECT; POINT; STATE
; INFORMATION; CALL; STACK; NON; GARBAGE; COLLECT; PROGRAM; COMPONENT
Derwent Class: T01
International Patent Class (Main): G06F-009/45
File Segment: EPI

25/5/10 (Item 4 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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015148907 **Image available**
WPI Acc No: 2003-209434/200320
XRPX Acc No: N03-166949

References tracking method in object oriented programming environments,
involves storing reference value for objects in execution stack, in
reference stack at same offset level as that in execution stack

Patent Assignee: SUN MICROSYSTEMS INC (SUNM)
Inventor: SOKOLOV S; WALLMAN D
Number of Countries: 100 Number of Patents: 003
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 20020169556	A1	20021114	US 2001851663	A	20010508	200320 B
WO 200291189	A2	20021114	WO 2002US14583	A	20020508	200320
GB 2391981	A	20040218	WO 2002US14583	A	20020508	200413
			GB 200325831	A	20031105	

Priority Applications (No Type Date): US 2001851663 A 20010508

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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US 20020169556	A1		15	G06F-019/00	
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WO 200291189	A2	E		G06F-012/02	
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Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA
CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN
IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ
OM PH PL PT RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG UZ VN YU ZA
ZM ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR
IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZM ZW

GB 2391981	A			G06F-012/02	Based on patent WO 200291189
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Abstract (Basic): US 20020169556 A1

NOVELTY - A reference stack is associated with an execution stack
(106) of same size and the objects in the execution stack, for which a
reference value is to be stored in the reference stack is determined. A
reference value corresponding to the determined objects is stored in
the reference stack in the same **offset** level as that in the execution
stack.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the
following:

- (1) Reference stack; and
- (2) Method for identifying references to Java objects.

USE - For tracking references in object oriented programming
environment like Java programming environment used in pagers, cell
phones, smart cards, super computers, embedded systems, for **garbage
collection**.

ADVANTAGE - Since the reference value corresponding to objects in
execution stack is stored in same **offset** as that in execution stack,
the entries in the reference stack can be checked against corresponding
entries in execution stack to ensure greater degree of certainty that
the identified entries represent references to active Java objects.

DESCRIPTION OF DRAWING(S) - The figure shows a computing
environment suitable for Java objects.

Execution stack (106)

pp; 15 DwgNo 1/8

Title Terms: REFERENCE; TRACK; METHOD; OBJECT; ORIENT; PROGRAM; ENVIRONMENT
; STORAGE; REFERENCE; VALUE; OBJECT; EXECUTE; STACK; REFERENCE; STACK;
OFFSET ; LEVEL; EXECUTE; STACK

Derwent Class: T01

International Patent Class (Main): G06F-012/02; G06F-019/00

File Segment: EPI

25/5/11 (Item 5 from file: 350)
DIALOG(R)File 350:Derwent WPIX

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014852797 **Image available**

WPI Acc No: 2002-673503/200272

XRPX Acc No: N02-532450

Memory reclamation method for computer system, involves creating local object on local heap of memory, using source code corresponding to address, when address of next source code is in data structure

Patent Assignee: SUN MICROSYSTEMS INC (SUNM)

Inventor: WALLMAN D

Number of Countries: 097 Number of Patents: 004

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 20020087589	A1	20020704	US 2000752886	A	20001228	200272 B
WO 200254249	A1	20020711	WO 2001US42056	A	20010905	200272
GB 2388685	A	20031119	WO 2001US42056	A	20010905	200401
			GB 200312812	A	20030604	
AU 2001291294	A1	20020716	AU 2001291294	A	20010905	200427

Priority Applications (No Type Date): US 2000752886 A 20001228

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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US 20020087589	A1		15	G06F-017/30	
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WO 200254249	A1	E		G06F-012/02	
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Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PH PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW

GB 2388685	A			G06F-012/02	Based on patent WO 200254249
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AU 2001291294	A1			G06F-012/02	Based on patent WO 200254249
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Abstract (Basic): US 20020087589 A1

NOVELTY - A data structure including addresses of source codes used for creating local objects, is obtained. When the address of next source code is determined to be in the data structure, a local object is created on a local heap of memory, using the source code associated with the address, such that the local objects are stored in a memory separately from non-local objects.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(1) Computer-readable recorded medium storing memory reclamation program; and

(2) Memory reclaiming apparatus.

USE - For computer software e.g. Java platform.

ADVANTAGE - Efficiency of reclamation of memory associated with various types of objects no longer in use, is greatly improved, without performing explicit **garbage collection**.

DESCRIPTION OF DRAWING(S) - The figure shows the flowchart illustrating the memory reclamation method.

pp; 15 DwgNo 5/9

Title Terms: MEMORY; RECLAIM; METHOD; COMPUTER; SYSTEM; LOCAL; OBJECT;

LOCAL; HEAP; MEMORY; SOURCE; CODE; CORRESPOND; ADDRESS; ADDRESS; SOURCE;

CODE; DATA; STRUCTURE

Derwent Class: T01

International Patent Class (Main): G06F-012/02; G06F-017/30

File Segment: EPI

25/5/12 (Item 6 from file: 350)

DIALOG(R) File: 350:Derwent WPIX

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014736448 **Image available**

WPI Acc No: 2002-557152/200259

XRPX Acc No: N02-441060

Java language string object storing method in object oriented computer

programming system, involves identifying string object from table of several objects for creation and storage of string object in fixed area of heap

Patent Assignee: SUN MICROSYSTEMS INC (SUNM); SOKOLOV S (SOKO-I); WALLMAN D (WALL-I)

Inventor: SOKOLOV S; WALLMAN D

Number of Countries: 097 Number of Patents: 004

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 20020073404	A1	20020613	US 2000736655	A	20001212	200259 B
WO 200257913	A2	20020725	WO 2001US51266	A	20011026	200259
US 6681234	B2	20040120	US 2000736655	A	20001212	200407
AU 2002243435	A1	20020730	AU 2002243435	A	20011026	200427

Priority Applications (No Type Date): US 2000736655 A 20001212

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
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US 20020073404	A1		7 G06F-009/44	
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WO 200257913	A2 E		G06F-009/44	
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Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PH PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW

US 6681234	B2		G06F-017/30	
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AU 2002243435	A1		G06F-009/44	Based on patent WO 200257913
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Abstract (Basic): US 20020073404 A1

NOVELTY - A fixed area of heap not subjected to **garbage collection** and for collection of Java language string objects is allocated. A request to create Java language string object is received. The string object is created and stored in fixed area of **heap**, if the object is **identified** in the table of string objects. The string object is stored in garbage area of heap, if the object to be created is not identified in the table.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

- (1) Storage medium storing string objects storing program; and
- (2) String objects storing apparatus.

USE - For storing Java language string objects created during initialization of virtual machine within an object oriented computer programming system.

ADVANTAGE - The waste of resources produced by the **garbage collector** operating on objects never to be deleted is eliminated by the placing of non-identified string objects in garbage area. Thereby the processing time is reduced.

DESCRIPTION OF DRAWING(S) - The figure shows the flowchart explaining the process of creating string objects during initialization of virtual machine.

pp; 7 DwgNo 3/3

Title Terms: LANGUAGE; STRING; OBJECT; STORAGE; METHOD; OBJECT; ORIENT; COMPUTER; PROGRAM; SYSTEM; IDENTIFY; STRING; OBJECT; TABLE; OBJECT; CREATION; STORAGE; STRING; OBJECT; FIX; AREA; HEAP

Derwent Class: T01

International Patent Class (Main): G06F-009/44; G06F-017/30

File Segment: EPI

25/5/13 (Item 7 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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013539562 **Image available**

WPI Acc No: 2001-023768/200103

Related WPI Acc No: 1997-470778

XRPX Acc No: N01-018519

Refuse handling assembly for garbage collection vehicle has refuse

container pivoted to support frame such that it is movable between lowered position and tilted position which centers at pivot mounting
 Patent Assignee: GARWOOD INT PTY LTD (GARW-N)
 Inventor: DE VRIES P; HORROCKS D J; HOUSTON M A; MCHUGH L J; OMMUNDSON B J
 Number of Countries: 001 Number of Patents: 001
 Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 6149371	A	20001121	WO 97AU138	A	19970306	200103 B
			US 98152522	A	19980914	

Priority Applications (No Type Date): AU 982513 A 19980320; AU 968637 A 19960312; AU 962280 A 19960912

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 6149371	A	13	B65F-003/20	CIP of application WO 97AU138

Abstract (Basic): US 6149371 A

NOVELTY - A refuse container (20) is pivoted to a support frame (14) such that it is movable between a lowered position and a tilted position which centers at a pivot mounting (16). A compactor (25) which includes a sweep blade (47) is disposed at a delivery inlet opening (21) formed to the bottom wall of the refuse container. The pivot axis of the blade is laterally **offset** from longitudinal axis of container.

DETAILED DESCRIPTION - The support frame forms part of the vehicle chassis (110) and includes a mounting section (13) which extends upwardly from the base (115) of the vehicle chassis. The other support frame section (14) extends upwardly from the mounting section with free end disposed rearwardly.

USE - For use with **garbage collection** vehicle.

ADVANTAGE - Small to enable effective collection of refuse from inaccessible area and transfer collected refuse appropriately to the refuse collecting vehicle.

DESCRIPTION OF DRAWING(S) - The figure shows a schematic side elevation of the vehicle with a refuse handling assembly.

Support frame (14)
 Pivot mounting (16)
 Refuse container (20)
 Delivery inlet opening (21)
 Compactor (25)
 Sweep blade (47)
 pp; 13 DwgNo 1/7

Title Terms: REFUSE; HANDLE; ASSEMBLE; GARBAGE; COLLECT; VEHICLE; REFUSE; CONTAINER; PIVOT; SUPPORT; FRAME; MOVE; LOWER; POSITION; TILT; POSITION; PIVOT; MOUNT

Derwent Class: Q35

International Patent Class (Main): B65F-003/20

File Segment: EngPI

25/5/14 (Item 8 from file: 350)
 DIALOG(R)File 350:Derwent WPIX
 (c) 2004 Thomson Derwent. All rts. reserv.

013466552 **Image available**
 WPI Acc No: 2000-638495/200061
 XRPX Acc No: N00-473580

Concurrently executed instruction scheduling method for garbage collection in VLIW processor by interleaving instructions of generated data structures linked by identifying pointers in memory heap and garbage collection process

Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG)

Inventor: HOULDSWORTH R J

Number of Countries: 025 Number of Patents: 007

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 200060469	A1	20001012	WO 2000EP2077	A	20000309	200061 B
EP 1082662	A1	20010314	EP 2000912579	A	20000309	200116
			WO 2000EP2077	A	20000309	
KR 2001025111	A	20010326	KR 2000713525	A	20001130	200161

CN 1306644	A	20010801	CN 2000800918	A	20000309	200172
TW 473663	A	20020121	TW 2000104709	A	20000315	200308
JP 2002541551	W	20021203	JP 2000609892	A	20000309	200309
			WO 2000EP2077	A	20000309	
US 6526421	B1	20030225	US 2000537822	A	20000329	200323

Priority Applications (No Type Date): GB 997280 A 19990331

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 200060469 A1 E 17 G06F-012/02

Designated States (National): CN IN JP KR

Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU
MC NL PT SE

EP 1082662 A1 E G06F-012/02 Based on patent WO 200060469

Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LI
LU MC NL PT SE

KR 2001025111 A G06F-012/02

CN 1306644 A G06F-012/02

TW 473663 A G06F-012/02

JP 2002541551 W 23 G06F-009/46 Based on patent WO 200060469

US 6526421 B1 G06F-017/30

Abstract (Basic): WO 200060469 A1

NOVELTY - The VLIW processor is divided into instruction slots (50-58). The state of the slots is shown at consecutive clock cycles/time points (A,B,C). At time point B, instruction (6) cannot be executed concurrently with instruction (4) and prevents slot (58) from being used.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a data processing apparatus, a program of instructions on a storage device readable by a machine.

USE - For **garbage collection** in VLIW processors.

ADVANTAGE - There is no drop in the performance of the processor as a result of interleaving of instructions from the program and **garbage collection** threads because unused concurrent execution resources of the processor are utilized for **garbage collection** without affecting the process being executed.

DESCRIPTION OF DRAWING(S) - The figure shows a representation of a VLIW processor executing the instruction.

Instructions (4,6)

Instruction Slots (50-58)

Time Points (A,B,C)

pp; 17 DwgNo 5/5

Title Terms: CONCURRENT; EXECUTE; INSTRUCTION; SCHEDULE; METHOD; GARBAGE;
COLLECT; PROCESSOR; INTERLEAVED; INSTRUCTION; GENERATE; DATA; STRUCTURE;
LINK; IDENTIFY; POINT; MEMORY; HEAP; GARBAGE; COLLECT; PROCESS

Derwent Class: T01

International Patent Class (Main): G06F-009/46; G06F-012/02; G06F-017/30

International Patent Class (Additional): G06F-009/45; G06F-012/00

File Segment: EPI

25/5/15 (Item 9 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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013465024 **Image available**

WPI Acc No: 2000-636967/200061

XRPX Acc No: N00-472265

Garbage collection assisting method for data processing system,
involves performing garbage collection in virtual object heap, only
when total number of objects in virtual object heap has reached threshold

Patent Assignee: INT BUSINESS MACHINES CORP (IBMC)

Inventor: HUBER G D; MCCAULEY D W

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 6070173	A	20000530	US 97979595	A	19971126	200061 B

Priority Applications (No Type Date): US 97979595 A 19971126

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 6070173	A		9	G06F-017/30	

Abstract (Basic): US 6070173 A

NOVELTY - Objects are allocated within a virtual object heap which is larger than a physical object **heap** . An **address** of one of the objects within the virtual object **heap** , is translated into a specific **address** located in the physical object **heap** . **Garbage collection** is done in the virtual object heap, only when total number of objects in the virtual object heap has reached threshold.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for **garbage collection** assisting apparatus.

USE - For data processing system such as Java virtual machine.

ADVANTAGE - Since Java objects are optimally placed in physical object heap, when being translated from virtual object heap, the variations in size and lifetime can quickly fragmentize the system memory. The usage of small, uniformly sized object allocation units in virtual object **heap** , and the possibility of object portion **mapping** between the object heaps, at any available location, helps to maximize utilization and re-usage of the system memory. Several small objects can be packed into a single object allocation unit to further improve utilization of the system memory. An object directory cache may be used to hide the object directory lookup under the DRAM RAS access such that any access latency penalty associated with object translation, is eliminated.

DESCRIPTION OF DRAWING(S) - The figure shows block diagram of object translation system.

pp; 9 DwgNo 4/4

Title Terms: GARBAGE; COLLECT; ASSIST; METHOD; DATA; PROCESS; SYSTEM; PERFORMANCE; GARBAGE; COLLECT; VIRTUAL; OBJECT; HEAP; TOTAL; NUMBER; OBJECT; VIRTUAL; OBJECT; HEAP; REACH; THRESHOLD

Derwent Class: T01

International Patent Class (Main): G06F-017/30

File Segment: EPI

25/5/16 (Item 10 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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013243258 **Image available**

WPI Acc No: 2000-415140/200036

XRPX Acc No: N00-310233

Multi-threaded processing memory managing by creating object in thread heap and monitoring whether object is local root

Patent Assignee: INT BUSINESS MACHINES CORP (IBM)

Inventor: KOLODNER E K; TROTTER M J

Number of Countries: 001 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
GB 2345159	A	20000628	GB 9828298	A	19981223	200036 B
GB 2345159	B	20030820	GB 9828298	A	19981223	200355

Priority Applications (No Type Date): GB 9828298 A 19981223

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
GB 2345159	A		23	G06F-009/44	
GB 2345159	B			G06F-009/44	

Abstract (Basic): GB 2345159 A

NOVELTY - The method involves creating an object (18) in thread heap (32) using multiples of 8 bytes and monitoring whether the object is a local root.

DETAILED DESCRIPTION - These objects in the **heap** which are not **identified** in the trace or root are not identified as global and are

treated as unused and are scheduled for deletion. During checking a heap size, if it is not enough of memory, then optionally increase the size of the hep. If still not enough memory, then full **garbage collection** is required. INDEPENDENT CLAIMS are included for: a system for managing memory in multi-thread processing environment and a computer program product stored on a computer readable medium, which when executed performs managing memory in multi-thread processing environment.

USE - As a memory management in a multithreaded runtime environment with **garbage collection** of storage objects with respect to a local stack.

ADVANTAGE - Keeps track of the object references using write barrier placed in any operation which assigns references e.g. putfield, putstatic and astore.

DESCRIPTION OF DRAWING(S) - The drawing shows a heap scheme according to the present invention.

object (18)

thread heap (32)

pp; 23 DwgNo 3/6

Title Terms: MULTI; THREAD; PROCESS; MEMORY; MANAGE; OBJECT; THREAD; HEAP; MONITOR; OBJECT; LOCAL; ROOT

Derwent Class: T01

International Patent Class (Main): G06F-009/44

File Segment: EPI

25/5/17 (Item 11 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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013084166 **Image available**

WPI Acc No: 2000-256038/200022

XRPX Acc No: N00-190367

Computer controlled method for localizing nodes in a garbage collected carded heap in a computer memory

Patent Assignee: SUN MICROSYSTEMS INC (SUNM)

Inventor: KNIPPEL R C; SCHWARTZ D C

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 6038572	A	20000314	US 97842070	A	19970423	200022 B

Priority Applications (No Type Date): US 97842070 A 19970423

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 6038572	A		47	G06F-017/00	

Abstract (Basic): US 6038572 A

NOVELTY - The method involves collecting the first set of nodes to a card-marked copied generation, and collecting the second set of remaining nodes to the card-marked copied generation.

DETAILED DESCRIPTION - The method involves localizing the first set of nodes in a card-marked older generation **heap** area, in which each node contains a **pointer** to an **address** of a younger generation **heap** area. The card-marked older generation heap area includes the intermixed nodes of the first and second sets of nodes. INDEPENDENT CLAIMS are also included for the following:

(a) the computer controlled system for localizing nodes in **garbage collected** carded heap;

(b) the node localizing apparatus;

(c) and the computer program product containing the node localizing instructions.

USE - For localizing nodes in a **garbage collected** carded heap in a computer memory. Useful in computer memory allocation and de-allocation.

ADVANTAGE - Provides economical method for localizing nodes in a card marked older generation heap area. Does not need manual operation since operations in the computer controlled method are performed by

machines. Has improved computational efficiency when determining reference set of an object by optimizing the gathering of pointer values that are intermixed with data values in the initiated object. More efficient since global hash **offset** variable is only updated at each scavenge instead of being loaded from memory, and stored to memory during every hash value calculation. Encompasses techniques related to card marking which is useful in indicating interesting areas of the **heap**. Quickly finds nodes that contain **pointers** related to marked card.

DESCRIPTION OF DRAWING(S) - The figure shows the process using the data structures in a memory to locate pointers.

pp; 47 DwgNo 3/10

Title Terms: COMPUTER; CONTROL; METHOD; NODE; GARBAGE; COLLECT; CARD; HEAP; COMPUTER; MEMORY

Derwent Class: T01

International Patent Class (Main): G06F-017/00

File Segment: EPI

25/5/18 (Item 12 from file: 350)

DIALOG(R)File 350:Derwent WPIX

(c) 2004 Thomson Derwent. All rts. reserv.

012934518 **Image available**

WPI Acc No: 2000-106365/200009

XRPX Acc No: N00-081680

Stored data object marking in memory compaction and garbage collection procedure executed in real or virtual memory space of data processing system

Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG); PHILIPS AB (PHIG); US PHILIPS CORP (PHIG)

Inventor: HOULDSWORTH R J; MORRIS S

Number of Countries: 022 Number of Patents: 006

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 9967697	A2	19991229	WO 99IB1088	A	19990610	200009 B
EP 1036355	A2	20000920	EP 99923792	A	19990610	200047
			WO 99IB1088	A	19990610	
KR 2001023063	A	20010326	KR 2000701680	A	20000218	200161
TW 440777	A	20010616	TW 99110319	A	19990621	200203
US 6393439	B1	20020521	US 99337845	A	19990621	200239
JP 2002519750	W	20020702	WO 99IB1088	A	19990610	200246
			JP 2000556294	A	19990610	

Priority Applications (No Type Date): GB 9813266 A 19980620

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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WO 9967697	A2	E	20	G06F-000/00	
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Designated States (National): JP KR

Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE

EP 1036355	A2	E		G06F-001/00	Based on patent WO 9967697
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Designated States (Regional): DE FR GB

KR 2001023063	A			G06F-012/02	
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TW 440777	A			G06F-017/30	
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US 6393439	B1			G06F-017/30	
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JP 2002519750	W		25	G06F-012/00	Based on patent WO 9967697
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Abstract (Basic): WO 9967697 A2

NOVELTY - A central processor unit (CPU) (10) is coupled via an address and data bus (12) to random access and read only memories (RAM, ROM) (14,16) and also to user input devices (18,20), while audio output is via speakers (22) with an audio processing stage (24) and video output is presented on a display screen (26) with a display driver stage (28). The process traverses points to detect objects linked to a root object and then traverses further points to detect objects linked to the detected objects until all **pointers** in the RAM have been traversed. Some **heap** objects carry **identifiers** and some, which are potentially reachable, are classed as pending, before a final sweep to

mark root objects is made.

DETAILED DESCRIPTION - AN INDEPENDENT CLAIM is included for a data processing apparatus.

USE - Handling of finalization for objects in memory compaction and **garbage collection** in real or virtual memory space of data processing apparatus.

ADVANTAGE - Minimized time to collection for objects whenever possible.

DESCRIPTION OF DRAWING(S) - The drawing is a block diagram of a system suitable to embody the present invention

CPU (10)
RAM and ROM (14,16)
Address and data bus (12)
User input devices (18,20)
Speakers (22)
Display screen (26)
Audio and video drive stages (24,28)
pp; 20 DwgNo 1/4

Title Terms: STORAGE; DATA; OBJECT; MARK; MEMORY; COMPACT; GARBAGE; COLLECT
; PROCEDURE; EXECUTE; REAL; VIRTUAL; MEMORY; SPACE; DATA; PROCESS; SYSTEM
Derwent Class: T01
International Patent Class (Main): G06F-000/00; G06F-001/00; G06F-012/00;
G06F-012/02; G06F-017/30
File Segment: EPI

25/5/19 (Item 13 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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012727579 **Image available**
WPI Acc No: 1999-533692/199945
XRPX Acc No: N99-396397

Garbage collection method implemented by Lisp, Smalltalk and Java -
involves scanning log buffer which indicates memory cell with heap mark
and route mark, and releasing memory cells without heap mark and route
mark

Patent Assignee: FUJITSU LTD (FUIT)
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 11232162	A	19990827	JP 9837018	A	19980219	199945 B

Priority Applications (No Type Date): JP 9837018 A 19980219

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
JP 11232162	A	8	G06F-012/00	

Abstract (Basic): JP 11232162 A

NOVELTY - A heap mark is attached to a memory cell indicated by a pointer. A route mark is attached to memory cells indicated by a route pointer . A log buffer indicates memory cell with **heap** mark and route mark. While scanning the log buffer, memory cells without heap mark and route mark are released.

USE - Implemented in Lisp, Smalltalk and Java for releasing unnecessary memory.

ADVANTAGE - Unnecessary memory cells are released easily and quickly by using stack as route pointer. DESCRIPTION OF DRAWING(S) - The figure shows **garbage collection** method.

Dwg.1/9

Title Terms: GARBAGE; COLLECT; METHOD; IMPLEMENT; SCAN; LOG; BUFFER;
INDICATE; MEMORY; CELL; HEAP; MARK; ROUTE; MARK; RELEASE; MEMORY; CELL;
HEAP; MARK; ROUTE; MARK
Derwent Class: T01
International Patent Class (Main): G06F-012/00
File Segment: EPI

25/5/20 (Item 14 from file: 350)
DIALOG(R) File 350: Derwent WPIX
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012588030 **Image available**
WPI Acc No: 1999-394137/199933
XRPX Acc No: N99-294557

Computer controlled node specifying method for memory allocation and deallocation

Patent Assignee: SUN MICROSYSTEMS INC (SUNM)
Inventor: SCHWARTZ D C; WOLCZKO M I
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5915255	A	19990622	US 97842196	A	19970423	199933 B

Priority Applications (No Type Date): US 97842196 A 19970423

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 5915255	A	46	G06F-017/30	

Abstract (Basic): US 5915255 A

NOVELTY - A current validation variable is maintained for link referenced area. The variable contains an area validation value depending on several scavange operations. A node is accessed through a link containing an **offset** value and a link validation value, into link referenced creation area. The node is allocated from generational **garbage collected heap**.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(a) apparatus for specifying node within creation area;

(b) computer readable medium storing node specification program

USE - For referencing active and garbage nodes in creation area of heap for memory allocation and deallocation in computer system.

ADVANTAGE - Avoids need for updating of all references to node when node is copied from creation area, allowing copying process to be interrupted when resolving links to copied node.

DESCRIPTION OF DRAWING(S) - The figure illustrates data structures in memory and process to locate pointers using data structures.

pp; 46 DwgNo 3A/10

Title Terms: COMPUTER; CONTROL; NODE; SPECIFIED; METHOD; MEMORY; ALLOCATE

Derwent Class: T01

International Patent Class (Main): G06F-017/30

File Segment: EPI

25/5/21 (Item 15 from file: 350)
DIALOG(R) File 350: Derwent WPIX
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012587880 **Image available**
WPI Acc No: 1999-393987/199933
XRPX Acc No: N99-294411

Hash value generating method in garbage collected heap of computer memory

Patent Assignee: SUN MICROSYSTEMS INC (SUNM)
Inventor: SCHWARTZ D C; UNGAR D M
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5911144	A	19990608	US 97842140	A	19970423	199933 B

Priority Applications (No Type Date): US 97842140 A 19970423

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 5911144	A	43	G06F-017/30	

Abstract (Basic): US 5911144 A

NOVELTY - After determining the hash value, the contents of global hash value is increased from zero to the size of creation area. In order to generate a hash condition, an object oriented technique is invoked and hash value is determined.

DETAILED DESCRIPTION - Hash value for a node (503) contained in creation area (501) is determined by adding the contents of node address contained in node **pointer** (505) and a global hash **offset** variable (507). INDEPENDENT CLAIMS are also included for the following:

- (a) hash value generating system;
- (b) a computer program product

USE - For generating hash values for nodes initially allocated from a creation area of a **garbage collected** heap in computer memory.

ADVANTAGE - The computer program product for generating a hash value is economical. Provides a data structure that can be simply scanned for pointer values and also simplifies the aspects of instantiated objects in an OOP environment.

DESCRIPTION OF DRAWING(S) - The figure shows the data structures in memory and process of utilizing these data structure for generating hash values.

Creation area (501)

Node (503)

Node pointer (505)

Global hash **offset** variable (507)

pp; 43 DwgNo 5A/10

Title Terms: HASH; VALUE; GENERATE; METHOD; GARBAGE; COLLECT; HEAP;

COMPUTER; MEMORY

Derwent Class: T01

International Patent Class (Main): G06F-017/30

File Segment: EPI

25/5/22 (Item 16 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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012577817 **Image available**

WPI Acc No: 1999-383924/199932

XRFX Acc No: N99-287422

Live pointer location encoding method in program data stack frame for computer system

Patent Assignee: SUN MICROSYSTEMS INC (SUNM)

Inventor: AGESEN O; UNGAR D

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5909579	A	19990601	US 97847770	A	19970423	199932 B

Priority Applications (No Type Date): US 97847770 A 19970423

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 5909579	A	17	G06F-009/44	

Abstract (Basic): US 5909579 A

NOVELTY - Live pointer locations in program data **stack frame** is computed at each boundary of sequence of byte-codes, and stored at selected boundaries. Any changes caused to the stored locations caused by each byte-code is encoded and then stored.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

- (a) live pointer location encoding apparatus;
- (b) computer program product;
- (c) **garbage collection** method for computer

USE - For encoding live pointer location in program data **stack frame** for computer system.

ADVANTAGE - Live pointers are located on computer systems which do not accommodate tagged data representations. There is no need for on-demand computation of live pointer information. Live pointer

information need not be stored for all byte-codes. Implementation in both object oriented and non-object oriented systems, single threaded and multi-threaded systems with multiple program stacks are enabled.

DESCRIPTION OF DRAWING(S) - The figure illustrates portion of byte-codes stream with full live pointer information stored for byte codes located at predetermined intervals and delta coded information stored for byte-codes between predetermined intervals.

pp; 17 DwgNo 2/5

Title Terms: LIVE; POINT; LOCATE; ENCODE; METHOD; PROGRAM; DATA; STACK;

FRAME; COMPUTER; SYSTEM

Derwent Class: T01

International Patent Class (Main): G06F-009/44

File Segment: EPI

25/5/23 (Item 17 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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012384602 **Image available**

WPI Acc No: 1999-190709/199916

XRPX Acc No: N99-139465

Data processor with localized memory reclamation

Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG); PHILIPS AB (PHIG); US PHILIPS CORP (PHIG)

Inventor: HOULSDWORTH R J; HOULSDWORTH R J

Number of Countries: 021 Number of Patents: 007

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 9910811	A1	19990304	WO 98IB1087	A	19980716	199916 B
EP 938706	A1	19990901	EP 98929599	A	19980716	199940
			WO 98IB1087	A	19980716	
JP 2001504970	W	20010410	WO 98IB1087	A	19980716	200128
			JP 99514094	A	19980716	
KR 2000068812	A	20001125	WO 98IB1087	A	19980716	200130
			KR 99703489	A	19990421	
US 6304949	B1	20011016	US 98138780	A	19980824	200164
US 20010039609	A1	20011108	US 98138780	A	19980824	200171
			US 2001866819	A	20010529	
US 6557091	B2	20030429	US 98138780	A	19980824	200331
			US 2001866819	A	20010529	

Priority Applications (No Type Date): GB 9717715 A 19970822

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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WO 9910811	A1	E	24	G06F-012/02	
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Designated States (National): JP KR

Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU

MC NL PT SE

EP 938706	A1	E		G06F-012/02	Based on patent WO 9910811
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Designated States (Regional): DE FR GB IT

JP 2001504970	W		28	G06F-012/00	Based on patent WO 9910811
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KR 2000068812	A			G06F-009/46	Based on patent WO 9910811
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US 6304949	B1			G06F-012/02	
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US 20010039609	A1			G06F-012/12	CIP of application US 98138780
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US 6557091	B2			G06F-012/02	CIP of application US 98138780
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CIP of patent US 6304949

Abstract (Basic): WO 9910811 A1

NOVELTY - At the conclusion of each thread memory **stack frame**, an associated reference buffer which holds pointers to each data object referred to by a respective **stack frame**, and which has been assigned to a respective memory **stack frame**, together with each referenced data object having no pointers to it in any other reference buffer are cleared by the processor.

DETAILED DESCRIPTION - A processor is coupled with a memory containing data objects, each stored at a known memory location and access via pointers carried by memory stacks associated with respective

threads. The processor periodically determines and deletes the data objects having no extant pointers from any source. A number of reference buffers are each assigned to a respective memory **stack frame** , and each holds pointers to each data object referred to by a respective **stack frame** . At the conclusion of each thread memory **stack frame** , the associated reference buffer and each referenced data object having no pointers to it in any other reference buffer are cleared by the apparatus. An INDEPENDENT CLAIM is included for a method for memory management.

USE - Memory compression and **garbage collection** in real or virtual memory space for handling multithread programs.

ADVANTAGE - Increases efficiency by distributing processing load typically involved in **garbage collection** in multithreading environment.

DESCRIPTION OF DRAWING(S) - The drawing shows functional relationships between general memory and reference stacks.

Data objects (DO)

Stack frames (SF)

Reference stacks (RS)

Random-access memory (HM)

Per-thread reference table (TT)

pp; 24 DwgNo 2/7

Title Terms: DATA; PROCESSOR; LOCALISE; MEMORY; RECLAIM

Derwent Class: T01

International Patent Class (Main): G06F-009/46; G06F-012/00; G06F-012/02; G06F-012/12

International Patent Class (Additional): G06F-009/44

File Segment: EPI

25/5/24 (Item 18 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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012127923 **Image available**

WPI Acc No: 1998-544835/199847

XRPX Acc No: N98-424254

Computer controlled method optimising garbage collection operation - optimises garbage collection on several elements based on pointer data parameterisation with 1st changed element index giving pointer array 1st modified element, last changed element index giving last modified element and stride value

Patent Assignee: SUN MICROSYSTEMS INC (SUNM)

Inventor: BEYLIN B; KNIPPEL R C

Number of Countries: 027 Number of Patents: 005

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 874317	A2	19981028	EP 98303013	A	19980420	199847 B
JP 10301837	A	19981113	JP 98111848	A	19980422	199905
US 5903900	A	19990511	US 97842139	A	19970423	199926
EP 874317	B1	20010613	EP 98303013	A	19980420	200134
DE 69800909	E	20010719	DE 600909	A	19980420	200148
			EP 98303013	A	19980420	

Priority Applications (No Type Date): US 97842139 A 19970423

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

EP 874317 A2 E 48 G06F-012/02

Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI

JP 10301837 A 39 G06F-012/00

US 5903900 A G06F-017/30

EP 874317 B1 E G06F-012/02

Designated States (Regional): DE FR GB NL SE

DE 69800909 E G06F-012/02 Based on patent EP 874317

Abstract (Basic): EP 874317 A

The method involves parameterising a pointer array dependent on a

programmed loop operation resulting in a pointer data parameterisation specifying a pattern of pointer assignments associated with the pointer array. Within the programmed loop operation the several pointer values are stored into the several elements without marking the card marked heap within the programmed loop operation.

The **garbage collection** operation is optimised on the several elements dependent on the pointer data parameterisation. This parameterisation has a first changed element index specifying a first modified element in the pointer array, a last changed element index specifying a last modified element and a stride value.

USE - For optimising **garbage collection** operation on several **pointer** values in **pointer** array in card marked **heap**, with **pointer** having several elements.

ADVANTAGE - Provides economical apparatus, method and system and computer program product for providing enhanced facilities for **garbage collection** programs.

Dwg.2/10

Title Terms: COMPUTER; CONTROL; METHOD; OPTIMUM; GARBAGE; COLLECT; OPERATE; OPTIMUM; GARBAGE; COLLECT; ELEMENT; BASED; POINT; DATA; CHANGE; ELEMENT; INDEX; POINT; ARRAY; MODIFIED; ELEMENT; LAST; CHANGE; ELEMENT; INDEX; LAST; MODIFIED; ELEMENT; STRIDE; VALUE

Derwent Class: T01

International Patent Class (Main): G06F-012/00; G06F-012/02; G06F-017/30

File Segment: EPI

25/5/25 (Item 19 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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011099235

WPI Acc No: 1997-077160/199707

XPX Acc No: N97-064121

Garbage collection, tail recursion method for stack-oriented programming language - involves initiating evacuation process to transport out of stack buffer into heap any live data objects found in stack buffer

Patent Assignee: BAKER H G (BAKE-I)

Inventor: BAKER H G

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5590332	A	19961231	US 95372514	A	19950113	199707 B

Priority Applications (No Type Date): US 95372514 A 19950113

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 5590332	A		54	G06F-009/45	

Abstract (Basic): US 5590332 A

The method involves converting one or more of the application subprograms into continuation-passing style (CPS) in the stack-oriented language. the extent and limit points of a stack buffer is determined on the execution stack of the stack-oriented language. the execution of the application is commenced such that the initial invocation **stack frame** is within the limits of the stack buffer. Any of the CPS-converted subprograms is interrupted when the execution stack pointer is beyond a limit point of the stack buffer. An evacuation process is initiated to transport out of the stack buffer into the heap any live data objects found in the stack buffer. The execution stack of the stack-oriented language is contracted back to the beginning of the stack buffer. The execution of the interrupted CPS-converted subprograms is resumed.

ADVANTAGE - Provides optimisation without requiring complex analysis of application using such mutually recursive subprograms.

Dwg.0/0

Title Terms: GARBAGE; COLLECT; TAIL; METHOD; STACK; ORIENT; PROGRAM; LANGUAGE; INITIATE; EVACUATE; PROCESS; TRANSPORT; STACK; BUFFER; HEAP;

LIVE; DATA; OBJECT; FOUND; STACK; BUFFER
Derwent Class: T01
International Patent Class (Main): G06F-009/45
File Segment: EPI

25/5/26 (Item 20 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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010945839 **Image available**
WPI Acc No: 1996-442789/199644
Related WPI Acc No: 1998-017968; 1998-556990
XRPX Acc No: N96-372889

Real-time GCM for object oriented multi-processor computer system -
includes object memory with garbage collection control unit
allocating space for object storage and retrieval on request by processor

Patent Assignee: UNIV IOWA STATE RES FOUND INC (IOWA)

Inventor: NILSEN K D; SCHMIDT W

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5560003	A	19960924	US 92994517	A	19921221	199644 B

Priority Applications (No Type Date): US 92994517 A 19921221

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 5560003	A	75	G06F-017/30	

Abstract (Basic): US 5560003 A

The **garbage collecting** module includes a memory for storing objects. The memory from-space and to-space regions for object storage. A word of each object is a header which specifies the size of the object and whether it contains **descriptors**. A unit communicates with the digital processor(s).

A **garbage - collecting** control unit allocates space for and stores an object in the memory upon request by one of the digital processor(s). It further causes an object to be retrieved from the memory and returned to one of the digital processor(s) upon request. It also **collects garbage** from the memory utilizing the source **descriptors** supplied by the digital processor(s).

ADVANTAGE - Can be used with wide variety of computers. Provides automatic garbage cleaning without causing excessive delays in application program execution.

Dwg.2/73

Title Terms: REAL; TIME; OBJECT; ORIENT; MULTI; PROCESSOR; COMPUTER; SYSTEM
; OBJECT; MEMORY; GARBAGE; COLLECT; CONTROL; UNIT; ALLOCATE; SPACE;
OBJECT; STORAGE; RETRIEVAL; REQUEST; PROCESSOR

Index Terms/Additional Words: GARBAGE; COLLECTING; MEMORY; MODULE

Derwent Class: T01

International Patent Class (Main): G06F-017/30

File Segment: EPI

25/5/27 (Item 21 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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009713706 **Image available**
WPI Acc No: 1993-407259/199351
XRPX Acc No: N93-315230

Computer system accessible data objects marking method for memory
garbage collection - identifying each object in memory by pointer, and
determining whether each stack entry is pointer or not

Patent Assignee: MICROSOFT CORP (MICT)

Inventor: ADCOCK J L

Number of Countries: 019 Number of Patents: 005

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 574884	A1	19931222	EP 93109545	A	19930615	199351 B
CA 2098459	A	19931216	CA 2098459	A	19930615	199409
US 5652883	A	19970729	US 92899616	A	19920615	199736
			US 95448238	A	19950523	
EP 574884	B1	20030219	EP 93109545	A	19930615	200314
DE 69332696	E	20030327	DE 632696	A	19930615	200329
			EP 93109545	A	19930615	

Priority Applications (No Type Date): US 92899616 A 19920615; US 95448238 A 19950523

Cited Patents: 2.Jnl.Ref; EP 430668; US 4907151

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 574884	A1	E	18	G06F-012/02	

Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE

CA 2098459	A		G06F-012/08
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US 5652883	A	17	G06F-012/12	Cont of application US 92899616
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EP 574884	B1	E	G06F-012/02
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Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE

DE 69332696	E		G06F-012/02	Based on patent EP 574884
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Abstract (Basic): EP 574884 A

The method involves identifying whether each stack entry is definitely not a pointer or possibly a pointer. For each new object possibly pointed to by a stack pointer that is identified as possibly a pointer, the new object is marked as accessible. Each new object that is accessible through the marked object is marked as accessible.

For each old object that is pointed to by a pointer in the list of pointers, each new object that is pointed to by a pointer contained in the old object is marked as accessible. Each new object that is accessible through the marked objects is marked as accessible.

ADVANTAGE - Provides improved **garbage collection** process for computer memory that combines advantages of conservative and generational **garbage collection** techniques. Identifies inaccessible objects in computer memory.

.d18

Dwg.9/9

Title Terms: COMPUTER; SYSTEM; ACCESS; DATA; OBJECT; MARK; METHOD; MEMORY; GARBAGE; COLLECT; IDENTIFY; OBJECT; MEMORY; POINT; DETERMINE; STACK; ENTER; POINT

Derwent Class: T01

International Patent Class (Main): G06F-012/02; G06F-012/08; G06F-012/12

File Segment: EPI

25/5/28 (Item 22 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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008236775 **Image available**

WPI Acc No: 1990-123776/199016

XRFX Acc No: N90-095975

Computer system for collection of garbage with ambiguous roots - has heap of storage divided into pages, labelled and allocated with root set of hints used to promote, copy and re-allocate pages

Patent Assignee: NIPPON DIGITAL EQUIP KK (DIGI)

Inventor: BARTLETT J F

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4907151	A	19900306	US 88251554	A	19880930	199016 B

Priority Applications (No Type Date): US 88251554 A 19880930

Abstract (Basic): US 4907151 A

The **garbage collection** method recovers unused memory in a heap of dynamically allocated storage. A heap of storage is divided into a number of pages and labels as allocated pages where each page in the heap is allocated for storing program objects. All other pages of the heap are labelled as unallocated pages. A root set of hints are identical which point directly and indirectly to all of the accessible program objects stored in the heap. The program objects store additional hints pointing to other ones of the program objects. The hints include unambiguous **pointers** to program objects stored in the **heap** and ambiguous **pointers** which may or may not point to program objects stored in the heap.

Pages labelled as allocated and pointed to by ambiguous pointers in the root set and in the accessible program objects are labelled as promoted pages. All accessible program objects are copied excepting those in promoted pages, to newly allocated pages in the heap. The steps of labelling promoted pages and copying includes the steps of labelling the promoted pages and newly allocated pages as allocated pages and labelling all other pages in the heap as unallocated pages.

ADVANTAGE - Simplified system. (31pp Dwg.No.7/11

Title Terms: COMPUTER; SYSTEM; COLLECT; GARBAGE; AMBIGUOUS; ROOT; HEAP; STORAGE; DIVIDE; PAGE; LABEL; ALLOCATE; ROOT; SET; PROMOTE; COPY; ALLOCATE; PAGE

Derwent Class: T01

International Patent Class (Additional): G06F-012/00

File Segment: EPI

25/5/29 (Item 23 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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004032612

WPI Acc No: 1984-178154/198429

XRFX Acc No: N84-132991

Symbolic language data processing method - having buffer memory storing data of contiguous main memory addresses and accessible at higher speed than main memory

Patent Assignee: SYMBOLICS INC (SYMB-N)

Number of Countries: 015 Number of Patents: 007

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 113460	A	19840718	EP 83112554	A	19831214	198429 B
AU 8322176	A	19840621				198432
CA 1214283	A	19861118				198651
IL 70279	A	19870430				198740
CA 1229682	A	19871124				198751
US 4887235	A	19891212	US 87129921	A	19871203	199007
US 4922414	A	19900501	US 87450600	A	19870908	199022

Priority Applications (No Type Date): US 82450600 A 19821217; US 8778724 A 19870908; US 87450600 A 19870908

Cited Patents: 10Jnl.Ref; A3...8814; No-SR.Pub; US 3611315; US 3701107

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

EP 113460 A E 133

Designated States (Regional): AT BE CH DE FR GB IT LI LU NL SE

Abstract (Basic): EP 113460 A

A main memory (MM) is connected on a common Line Bus (LBUS) to which other devices (OD) like peripheral and state units can be connected for intercommunication. The system architecture includes a synergistic combination of the Lbus, microtasking, centralised error correction circuitry and a sync. pipelined memory. The memory includes processor mediated direct memory access.

The architecture also includes stack cache windows with two segment addressing, a page hash table and page hash table cache, **garbage collection** and pointer control. A close connection of the macrocode and microcode enables one to take interrupts in and out of the

macrocode instruction sequences. Also included are parallel data type checking with tagged architecture, procedure call and microcode support.